

## REMARKS

Applicant has added new claim 43. Claims 22-43 are pending in this application.

In the Office Action, the Examiner finally rejected claims 22-25, 28-36 and 38-40 under 35 USC 102(b) as being anticipated by Xiao (US Patent 5,537,247). The Examiner also rejected claims 26, 27, 37, and 41 under 35 USC 103(a) as being unpatentable over Xiao.

Applicant presents those claims herein without any amendment (with the exception for claim 26 to correct a typographical error) for reconsideration by the Examiner.

The present invention as claimed in claim 22 concerns a novel arrangement for separating excitation light from detection light with high efficiency without being wavelength dependent. This concept can be illustrated with reference to FIG. 4A and 4B. An **illumination light is focused in a pupil plane P** of the microscope device. As is well-known, the pupil plane is defined as being “in or in the vicinity of the back focal plane of the objective or in a plane conjugate to the back focal plane of the objective (back focal plane P is shown in the drawing)” on page 11, lines 18-20 in the specification.

Based on the type of specimen interaction, the detection light from the specimen has low spatial coherence. This means that each point excited in the specimen radiates as a point radiator in all spatial directions essentially independent from the neighboring points. The optics O (e.g., a microscope objective) image the individual point radiators together with the tube lens TL in an intermediate image plane ZB of the microscope device, the pupil P being uniformly illuminated by mutually incoherent wavefronts of different propagation directions (detection beam path indicated by dashes). A detector device such as a CCD camera or an eyepiece can be used for detection of the specimen in the intermediate image plane.

The novel spatial separator MDB according to the invention (see Fig. 4B for example) which carries out the separation of illumination light and detection light is **located in the pupil plane P**. The MDB is fully reflecting in the area HR shown in gray in the drawing. The area HT shown in white around the coordinate origin of XY is highly transmissive,

particularly for the wavelength region in which the specimen excitation is to be carried out. In the simplest case, the HT area can be a hole in the otherwise reflecting element.

In operation, the excitation light from the light source LQ is focused through the HT area according to the invention. The light reflected on a direct path from the specimen arrives again at the light source particularly through the HT area. The excitation light which is diffusely scattered by the specimen or the light which is excited in the specimen strikes the entire surface of the MDB corresponding to the pupil size of the microscope optics, the portion striking the HR area being deflected in direction TL and made available for observation in the intermediate image by the detector. Only the portion of the detection radiation falling on the HT area is lost in this arrangement at MDB.

Advantageously, the efficiency of the beam splitting of MDB can reach 99% because the light separation is not wavelength dependent unlike the prior art. This efficiency is possible because of the novel features that the spatial separator is located at the pupil plane and that the excitation/illumination light is focused at the pupil plane.

In sum, the novel features described above are: 1) focusing means that focus an illumination light in the pupil plane; and 2) apparatus that is positioned in the pupil plane to spatially separate the illumination light from the detection light.

These features are recited in claim 22 as “**means for focusing** specimen illumination in and/or in the vicinity of **a pupil plane of a beam path**” and “**apparatus being provided in said pupil plane** for spatially separating the illumination light from the detection light”.

The Examiner stated that the aperture plate 50 of Xiao is equivalent to “apparatus being provided in said pupil plane” (e.g., MDB) as claimed in claim 22. Applicant respectfully disagrees.

First, the aperture plate 50 is not positioned in the pupil plane of the microscope because the collimator 31, which makes the illumination parallel, makes it impossible for the aperture plate 50 to be at the back focal plane of the objective 34. As seen in FIG. 2 of the Xiao reference, the back focal plane (pupil plane) is located around the up-down arrow above

the objective lens 34 since the distance from the lens 34 to the focal plane at 71 is about the same as the distance from lens 34 to the up-down arrow. For the Examiner's assertions to be true, the aperture plate 50 would have to be positioned at about the up-down arrow.

Second, claim 22 requires the focused illumination to be in the pupil plane where the spatial separator is positioned. Since the aperture plate 50 is not positioned at the pupil plane, the illumination light cannot be positioned at the pupil plane either. Moreover, because of the collimating lens 31, the illumination beam at around the up-down arrow (pupil plane) is parallel rather than focused.

Third, the aperture plate 50 does not spatially separate the excitation light from the detection light as recited in claim 22. Xiao states at col. 5, lines 14-26 that the same aperture plate 50 that passes excitation light through also passes back the detection light coming back from the specimen. Xiao specifically states that it uses "the same aperture for both the incident and return light".

In "Response to Arguments" on page 5 of the Office Action, the Examiner states that "Xiao clearly discloses, in Col. 2, lines 14-31, that he uses the aperture system 50 as a spatial filter whereby the light returning from the specimen is separated from the illumination light and that the aperture system can include filters, beam splitters and light stops". Applicant respectfully disagrees. The Examiner is referring to Xiao's statement that the aperture plate is used to shield return light path from unwanted interference such as scattered and undesired reflected light. By contrast, claim 22 requires the spatially separating apparatus (e.g., MDB) to separate the excitation light from "**detection light**" and not separate unwanted interference signals. The detection light is "wanted" light that is imaged in the detector, not unwanted interference signals.

Further, the Examiner on page 3, lines 4-5 of the Office Action stated that "The plate 50 could also take the form of the beam splitter 55 acting as a spatial separator." Applicant is unsure whether the Examiner is referring to some element other than element 55 which is not a beam splitter. However, claim 22 requires the beam splitter to be positioned at the pupil

plane which is between the specimen plane and the detection plane. Since element 55 is positioned only in the illumination plane, Xiao cannot anticipate claim 22.

The arrangement of Xiao uses a pinhole in the joint illumination and detection beam path (col. 2, ll 45-50; col. 5, l 20 ff). The beam splitter to separate the detection from the illumination is done by element 41 (col 4, l 21 ff; col 5, l 35 ff). The aperture is angled or AR coated to reduce unwanted light from the detection beam path. Unwanted light results from light which can not be passed through the aperture 51 (col 6 l 27 ff). The definition of aperture and its use in the arrangement of an LSM is written in col 1, l 35 ff.

Hence, the aperture is acting as a classical confocal aperture of a LSM. The aperture has nothing to do with beam splitting at all. The aperture 50 is in its position and function comparable to the slit aperture in the present application. The slit aperture is state of the art. Moreover, the aperture 50 in Xiao is not located in a pupil plane as discussed above. In our arrangement, the beam splitter is located in the pupil plane.

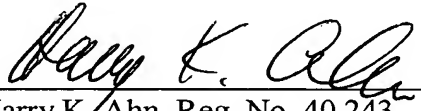
Applicant submits that Claims 23-42 are also allowable by virtue of their dependency from independent claim 22.

Applicant has added claim 43 which is drawn along the lines of claim 22. It is believed that the added claim would not raise new issues that would require a new search to be conducted. As such, Applicant respectfully requests that claim 43 be entered. For the similar reasons as discussed above with respect to claim 22, Applicant submits that claim 43 is also allowable.

Based upon the above amendments and remarks, Applicant respectfully requests reconsideration of this application and its earlier allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,

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